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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/675,575	09/30/2003	Leonard J. Olmer	BEVERS 2-3-16-20	9967
47396	7590	01/14/2008		
HITT GAINES, PC LSI Corporation PO BOX 832570 RICHARDSON, TX 75083			EXAMINER HECKERT, JASON MARK	
			ART UNIT	PAPER NUMBER
			1792	
			NOTIFICATION DATE	DELIVERY MODE
			01/14/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docket@hittgaines.com

Office Action Summary	Application No. 10/675,575	Applicant(s) OLMER ET AL.	
	Examiner Jason Heckert	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7, 9-12, 14-20, 22, 24-26, 28 and 30-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-12, 14-20, 22, 24-26, 28 and 30-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/29/07 has been entered.

Response to Arguments

2. Due to the amendments to the claims, the previous rejections are rendered moot.

3. In regards Pomarede's step for injecting nitrogen fluoride, examiner asserts that he presents motivation to do so prior to a subsequent deposition. Although his motivation may be different than the applicant's, he still presents sufficient reason for performing the step. Furthermore, Xia et al. discloses injecting NF₃ for contaminant removal prior to a subsequent deposition at a range of temperatures similar to the applicant's invention. Thus, art exists that renders the applicant's motivation for the injection of NF₃ prior to deposition obvious.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 1-5, 7, 9-12, 14-20, 22, 24-25, 26, 28, 30-36 rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the art (ASA) in view of Pomarede. The admitted state of the art (applicant's specification 0003 – 0016) clearly discloses that it was known at the time of the invention to utilize a resistively heated chuck to stabilize the surface of a substrate at 700 deg C after forming a hydrogen termination on the surface. The ASA also discloses that it is known to stabilize before and during deposition of the arsenic-doped polysilicon layer. The ASA also discloses an HF dip, RCA cleaning process, drying with IPA, nitrogen gas flow during deposition, and a hydrogen bake. The ASA does not disclose removing contaminants from the surface of the substrate prior to deposition of a second layer with nitrogen fluoride. Pomarede discloses a method for treating a substrate, including one with an epitaxial silicon layer, prior to deposition of a second layer as well. The substrate is cleaned, using SC1 [RCE process]/HF bath, much like the ASA. A hydrogen bake is also an alternative. Both options leave a hydrogen terminated surface. Pomarede then discloses that NF₃ gas is introduced into the chamber. After the introduction of said gas, a deposition occurs between 500 – 800 deg C (0094). Pomarede asserts that it will be understood that the processing methods disclosed can be used with other heating systems, such as inductive or resistive heating systems (0037). The cleaning, introduction of gas, and deposition all occur in situ at relatively constant pressures. Pomarede discloses that this method can be used with arsenic-doped polysilicon deposition (paragraph 0102). Thus, Pomarede gives motivation for exposing a surface

to NF3 prior to deposition of a second layer. Whether or not said motivation is consistent with the applicant's is not an issue of patentability. One skilled in the art would have found it obvious at the time of the invention to modify the ASA and inject NF3 gas prior to deposition of a second material layer, as disclosed by Pomarede, in order to facilitate subsequent deposition without any appreciable deposition during injection.

6. Pomarede does disclose that for the given temperature, pressure, reaction times, and reaction concentrations can be adjusted to achieve the desired surface conditioning (0065). Examiner feels that flow rate and duration fall under the obvious modifications Pomarede alludes to. Furthermore, it is well settled that determination of optimum values of cause effective variables such as flow rate is within the skill of one practicing the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). It would have been obvious at the time of the invention to modify the flow rate, concentration, or exposure time to achieve the desired breaking of surface bonds without significant bulk modification in order to obtain the desired conditioning.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5963840 to Xia et al. Xia discloses that NF3 can be used in situ prior to deposition of a material layer to remove native oxides and other contaminants. The temperature disclosed is preferably 550-600 deg C (col. 45 lines 50-67). The system utilizes a heated chuck 25. Thus, the motivation for using NF3 to

remove contaminants from a substrate prior to deposition was also known at the time of the invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Heckert whose telephone number is (571) 272-2702. The examiner can normally be reached on Mon. to Friday, 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMH



MICHAEL BARR
SUPERVISORY PATENT EXAMINER